Roll No.

(In figures as in Admit Card)

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(In words)

COMPUTER SCIENCE AND APPLICATIONS Paper II

JY—04/19

Name of the Areas/Section (if any).....................

Time Allowed : 75 Minutes]   [Maximum Marks : 100

Instructions for the Candidates

1. Write your Roll Number in the space provided on the top of this page.
2. This paper consists of *fifty* (50) multiple choice type questions. *All* questions are compulsory.
3. Each item has upto four alternative responses marked (A), (B), (C) and (D). The answer should be a capital letter for the selected option. The answer letter should entirely be contained within the corresponding square.

    Correct method ☐A☐   Wrong Method ☐A or ☒A☒

4. Your responses to the items for this paper are to be indicated on the ICR Answer Sheet under paper II only.
5. Read instructions given inside carefully.
6. One sheet is attached at the end of the booklet for rough work.
7. You should return the test booklet to the invigilator at the end of paper and should not carry any paper with you outside the examination hall.

SEAL

પરીક્ષાર્થીઓ માટેની સૂચનાઓ :

૧.   આ પાનાની ટોચમાં દર્શાવેલી જગ્યામાં તમારો રોલ નંબર લખો.

૨.   આ પ્રશ્નપત્રમાં કુલ **પચાસ (50)** બહુવૈકલ્પિક ઉત્તરો ધરાવતા પ્રશ્નો આપેલા છે. **બધા જ પ્રશ્નો ફરજિયાત છે.**

૩.   પ્રત્યેક પ્રશ્ન વધુમાં વધુ ચાર બહુવૈકલ્પિક ઉત્તરો ધરાવે છે. જે (A), (B), (C) અને (D) વડે દર્શાવવામાં આવ્યા છે. પ્રશ્નનો ઉત્તર કેપીટલ સંજ્ઞા વડે આપવાનો રહેશે. ઉત્તરની સંજ્ઞા આપેલ ખાનામાં બરાબર સમાઈ જાય તે રીતે લખવાની રહેશે.

     ખરી રીત : ☐A☐ ખોટી રીત : ☐A , ☒A☒

૪.   આ પ્રશ્નપત્રના જવાબ આપેલ ICR Answer Sheet ના Paper II વિભાગની નીચે આપેલ ખાનાંઓમાં આપવાના રહેશે.

૫.   અંદર આપેલ સૂચનાઓ કાળજીપૂર્વક વાંચો.

૬.   આં બુકલેટની પાછળ આપેલું પાનું રફ કામ માટે છે.

૭.   પરીક્ષા સમય પૂરો થઈ ગયા પછી આ બુકલેટ જે તે નિરીક્ષકને સોંપી દેવી. કોઈપણ કાગળ પરીક્ષા ખંડની બહાર લઈ જવો નહી.

COMPUTER SCIENCE AND APPLICATIONS
PAPER-II

Note : This paper contains **fifty (50)** multiple-choice questions, each question carrying **two (2)** marks. Attempt *All* the questions.

1. Given the pairs of sets :

    (i)   {1, 3, 3, 3, 5, 5, 5, 5}, {5, 3, 1}

    (ii) {{1}}, {1, {1}}

    (iii) ϕ, {ϕ}

    Which of the following is *correct* ?

    (A)   sets in (i) only are equal sets

    (B)   sets in (ii) only are equal sets

    (C)   sets in (iii) only are equal sets

    (D)   sets in (i) and (iii) are equal sets

2. Let A = {1, 2, 3, 4}. The cardinality of the relation R = {(a, b)| a divides b} is :

    (A)   10   (B) 9

    (C)   8   (D) None of these

3. The language accepted by PDA is :

    (A)   Regular language

    (B)   Context free language

    (C)   Context sensitive language

    (D)   None of the above

4. For every finite automaton of Q states there exists an equivalent NFA of :

    (A) $10^{|Q|}$ states   (B) $2^{|Q|}$ states

    (C) $2^{|Q|*|Q|}$ states   (D) $10^{|Q|*|Q|}$ states

5. Given the assertion "The graph G has two components and all its vertices have even degree", which of the following is a valid conclusion ?

    (A)   G is a Euler graph   (B) G is a Hamiltonian graph

    (C)   G is a tree   (D) G is disconnected

6. Any irreducible polynomial over GF(2) of degree m (> 0) divides polynomial (in x) :

(A) $x^{2^m-1} - 1$

(B) $x^{2^m} - 1$

(C) $x^{2^{m-1}} - 1$

(D) $x^{2^m} + 1$

7. The argument form $\{(P \Rightarrow Q) \wedge \sim Q\} \Rightarrow \sim P$ is called :

(A) modus ponens

(B) modus tollens

(C) indirect method

(D) direct method

8. Which of the following is *true* for the logic gate families such as TTL, CMOS etc. ?

(A) Switching speed and power consumption are inversely proportional

(B) Switching speed and power consumption are directly proportional

(C) The switching speed and power consumption are not related

(D) None of the above

9. Consider the three input majority function given by

$$F(A, B, C) = \overline{A}.B.C + A.\overline{B}.C + A.B.\overline{C} + A.B.C$$

The minimal form of this is given by :

(A) $\overline{A} + B + C$

(B) $(AB + \overline{A}B).C$

(C) $BC + AC + AB$

(D) $AB\overline{C} + ABC + AC$

10. The hexadecimal equivalent of the decimal number .25 is :

(A) .25

(B) .40

(C) .35

(D) None of these

11. The storage management technique used in C language for local variables of a function is :

(A) Heap

(B) Stack

(C) Queue

(D) None of these

12. Which of the following is *correct* syntactically ?

    (A) main (int * argc, char ** argv)

    (B) main (char * argv [ ], int argc)

    (C) main (char * argv, int argc)

    (D) main (int argc, char * argv [ ])

13. A characteristic of object oriented programming language called polymorphism is :

    (A) A function is referred by different names

    (B) Different functions are referred by same name

    (C) Protected data members are not accessible

    (D) Private data members are not accessible

14. The syntax for exception handling in C++ is :

    (A) function ( ) throw string catch ( ) { } try { }

    (B) function ( ) throw string try { } catch ( ) { }

    (C) function ( ) throw string try { } catch ( ) throw string { }

    (D) None of the above

15. If you declare a pointer to a const object, then :

    (A) You can call only const methods with that pointer

    (B) You can call any methods with that pointer

    (C) You cannot call any methods with that pointer

    (D) None of the above

16. The application programs in a database system must exhibit :

    (A) Physical data independence only

    (B) Logical data independence only

    (C) Both (A) and (B)

    (D) None of the above

17. SQL includes :

    (A) Data Definition Language only

    (B) Data Manipulation Language only

    (C) DDL and DML

    (D) Queries only

18. In an ER diagram the rectangles represent :

    (A) Entity sets   (B) Relationship sets

    (C) Attributes   (D) Weak entity sets

19. Given a relational schema

$$R = (A, B, C, D, E, G)$$

    and the set of FDs

$$F = (A \rightarrow B, A \rightarrow C, CD \rightarrow E, B \rightarrow D, E \rightarrow A)$$

    the key of the relation R is :

    (A) D   (B) C

    (C) B   (D) A

20. The functional dependency satisfied by the relation :

A	B	C
a_1	b_1	c_1
a_1	b_1	c_2
a_2	b_2	c_1
a_2	b_2	c_3

    is :

    (A) $A \rightarrow B$ (B) $A \rightarrow C$

    (C) $C \rightarrow A$ (D) $B \rightarrow C$

21. A tree data structure cannot be implemented using :

    (A) Array   (B) Linked list

    (C) Stack   (D) Doubly linked list

22. In a balanced heap of size n, an element can be accessed in :

(A) $n \log_2 n$ operations

(B) $\frac{n}{2} \log_2 n$ operations

(C) $\log_2 n$ operations

(D) $\frac{1}{2} \log_2 n$ operations

23. The Quicksort algorithm, has the average execution time (n is the number of elements to be sorted) :

(A) $0 \ (n^2)$

(B) $0 \ (n(\log_2 n))$

(C) $0 \ (n(\log_2 n)^2)$

(D) None of these

24. Let L be the smallest integer $\geq \frac{n}{2}$, where n is the order of a B-tree, then the number of nodes at level m is given by :

(A) L^{m-2}

(B) $2 * L^{m-2}$

(C) $2 * L^{m-1}$

(D) $2 * L^m$

25. Which layer of OSI model is designed to establish, maintain and synchronize the interaction between communicating systems ?

(A) Transport

(B) Application

(C) Session

(D) Data link

26. The TCP/IP model consists of :

(A) 7 layers

(B) 6 layers

(C) 5 layers

(D) 4 layers

27. A switch is an intermediary :

(A) Hardware part that links devices together temporarily

(B) Software that links devices together temporarily

(C) Hardware or software that links devices together temporarily

(D) Firmware that links devices together temporarily

28. On which layer will repeaters operate ?

(A) Data link

(B) Network

(C) Physical

(D) Session

29. ATM standard defines :
   (A) 2 layers
   (B) 3 layers
   (C) 5 layers
   (D) 7 layers

30. For digital signature the following key pair is used for encryption and decryption, in sequence :
   (A) Public key, Private key
   (B) Private key, Public key
   (C) Public key, Public key
   (D) Private key, Private key

31. An object code which is relocatable uses address references which are :
   (A) Absolute
   (B) Relative to index register
   (C) Relative to base register
   (D) Incremental to program counter

32. Although statically linked object code can be moved from one system to another system, one of its main disadvantages is :
   (A) smaller size as compared to dynamically linked code
   (B) smaller load time as compared to dynamically linked code
   (C) larger storage size as compared to dynamically linked code
   (D) None of the above

33. The following phase of the compilation process is maximum time consuming one :
   (A) Lexical analysis
   (B) Syntax analysis
   (C) Code generation
   (D) Space allocation

34. YACC is used for building :
   (A) Interpreters
   (B) Operating systems
   (C) Compilers
   (D) Assemblers

35. Given the following production rule of a grammar :
$$A \rightarrow A * B/B$$
the left recursion can be removed by using (ε is NULL symbol) :
   (A) $A \rightarrow CA', A' \rightarrow * BA' / C$
   (B) $A \rightarrow BA', A' \rightarrow * BA' / \varepsilon$
   (C) $A \rightarrow * BA' / \varepsilon, A' \rightarrow A$
   (D) None of these

36. For optimizing loops we compute :
   (A) Loop variables
   (B) Loop index
   (C) Loop invariants
   (D) Loop variants

37. Which system call allows the same file to appear under two or more names, often in different directories ?
   (A) create ( )   (B) link ( )
   (C) fstat ( )   (D) exec ( )

38. A filtering utility also having programming capability is :
   (A) grep   (B) sed
   (C) awk   (D) cut

39. Which one of the following is an *invalid* statement ?
   (A) Deadlock will occur only if required resources are sharable
   (B) If deadlock had occurred then there will be at least two processes in deadlock
   (C) A state is said to be safe if it is not deadlocked
   (D) Banker's Algorithm is used to avoid deadlocks

40. Spiral model for software development is suitable when :
   (A) Entire software specifications are available in the beginning
   (B) Software specifications need to be exploited along with the development process
   (C) There are only scientific applications
   (D) The object oriented approach is used

41. The present software projects have tendency to give more emphasis on the following part of software design :
   (A) Code optimization   (B) User interface design
   (C) Multiple level of testing (D) System analysis

42. Belady's anomaly is a drawback noticed in which of the following page replacement methods :
   (A) LRU   (B) FIFO
   (C) LIFO   (D) NRU

43. A multiprogramming system using a Round-Robin scheduling is presently showing poor throughput and very frequent disk access. The throughput of this system can be increased by which of the following techniques ?
   (A) reducing degree of multiprogramming
   (B) Adding more disk space
   (C) Adding a printer
   (D) Reducing the number of terminals

44. While handling WM_PAINT, which API call is used obtain a device context :
    (A) GetDC( )   (B) TextOut ( )
    (C) EndPaint ( )   (D) BeginPaint ( )

45. Given $(P \wedge Q) \Rightarrow (R \wedge S)$, which of the following is *not* valid ?
    (A) $P \wedge Q \Rightarrow R$ (B) $P \wedge Q \Rightarrow S$
    (C) $P \Rightarrow R \wedge S$ (D) None of these

46. Consider a set A = {1, 2, 3, 4, 5}. The number of reflexive relations on A
    is :
    (A) countably infinite   (B) finite but not specifiable
    (C) 2^5 (D) 2^{20}

47. The 8085 code
        PUSH B
        POP D
    performs the following job :
    (A) Moves contents of B Register to D Register
    (B) Moves contents of D Register to B Register
    (C) Moves contents of BC pair to DE pair
    (D) Moves contents of DE pair to BE pair

48. Which of the following 8085 processor pin is used for interfacing of slow memory
    or slow devices ?
    (A) ALE   (B) READY
    (C) HALT   (D) SID

49. The C programming language is :
    (A) object oriented language
    (B) logic programming language
    (C) procedural language
    (D) functional programming language

50. Which of the following is/are inherited translation ?

Production	Semantic Action
(i) $E \rightarrow E^{(1)} + E^{(2)}$	{E.VAL := $E^{(1)}$.VAL + $E^{(2)}$.VAL}
(ii) $E \rightarrow E^{(1)}.E^{(2)}$	{$E^{(2)}$.VAL := 2 * $E^{(1)}$.VAL}
(iii) $E \rightarrow$ digit	{E.VAL := digit}

    (A) (i) only   (B) (ii) only
    (C) (i) and (iii) only   (D) None of these

ROUGH WORK

ROUGH WORK